PAINTING AND DIGGING OUT

Variations on Standard Brillianteering of Round Brilliant Diamonds

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In the final stages of cutting — the brillianteering process — cutters sometimes use "painting" or its opposite "digging out" to improve weight retention. However, these processes can affect the face-up appearance of a diamond, particularly its contrast pattern. Figure 1 (top) illustrates a round brilliant diamond before this last polishing step, which includes the fashioning of the stars and the halves (also called the upper girdle and lower girdle facets) that produce the final girdle profile. Figure 2 shows a girdle profile with "standard" brillianteering (no painting or digging out). The average thickness of the girdle at the bezel-main junctions is about equal to its thickness at the upper and lower half junctions (that is, distance B is *equal* to distance A). While distance A is largely determined during the initial planning stage, distance B can be determined during the final steps of polishing as it is solely the result of the upper-half and lower-half facet polishing.

Painting is produced by shifting the upper-half or lower-half facet positions in relation to the bezels or pavilion mains so that there is less definition between them. Because the half facets are anchored at the point of the star facets or the junction of the pavilion mains,

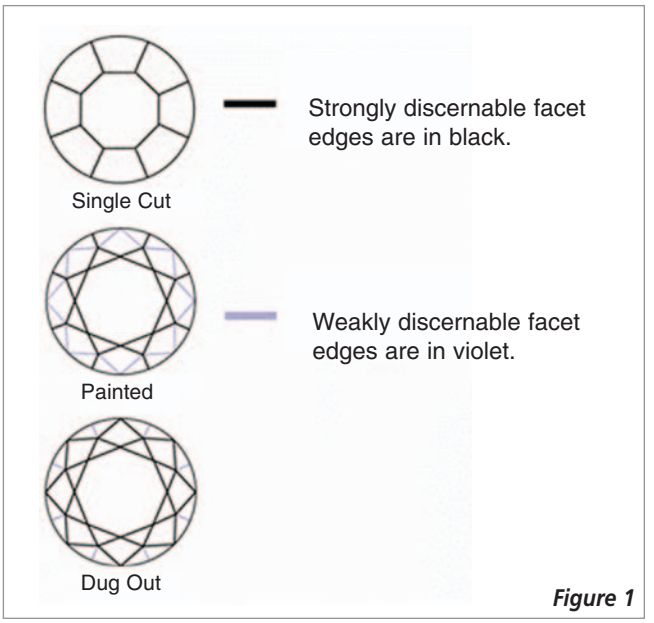
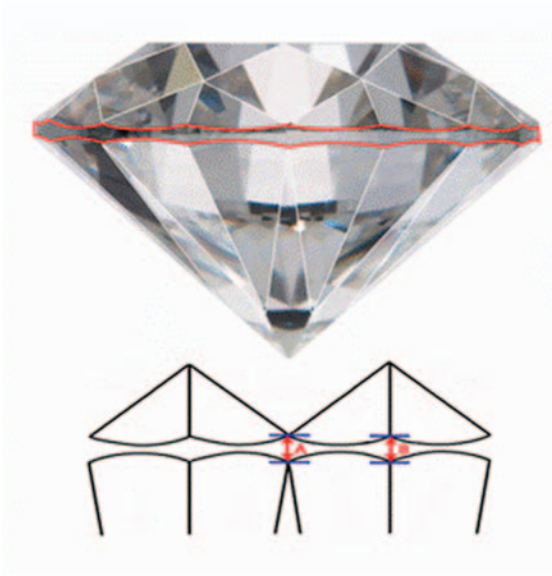


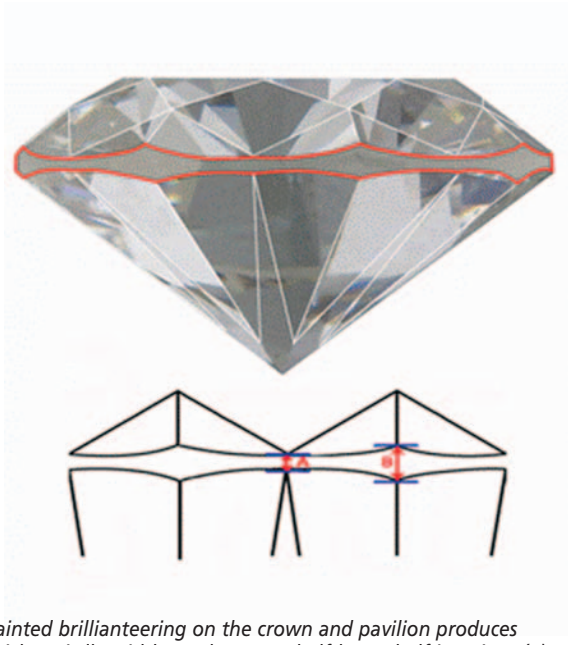
Figure 1

Comparison of single-cut face-up diamond outline (top) with painted crown (middle) and dug-out crown (bottom) variations. Violet lines represent low angle facet edges. Painted crowns lead to upper halves that are barely discernible from the bezel facets (middle), causing the fully brillianteered diamond to resemble a single cut. Digging out (bottom) causes the upper halves to be barely discernible from each other.



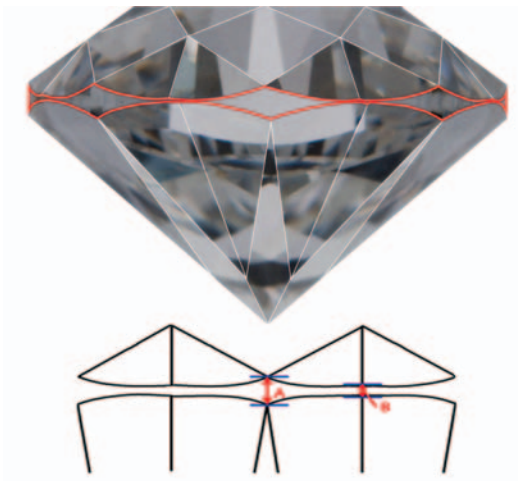
Standard brillianteering produces even girdle thicknesses at the upper half-lower half junctions (B) and the bezel-main junctions (A).

Figure 2



Painted brillianteering on the crown and pavilion produces thicker girdle widths at the upper half-lower half junctions (B) than at the bezel-main junctions (A).

Figure 3



Dug-out brillianteering on the crown and pavilion produces thinner girdle widths at the upper half-lower half junctions (B) than at the bezel-main junctions (A).

Figure 4

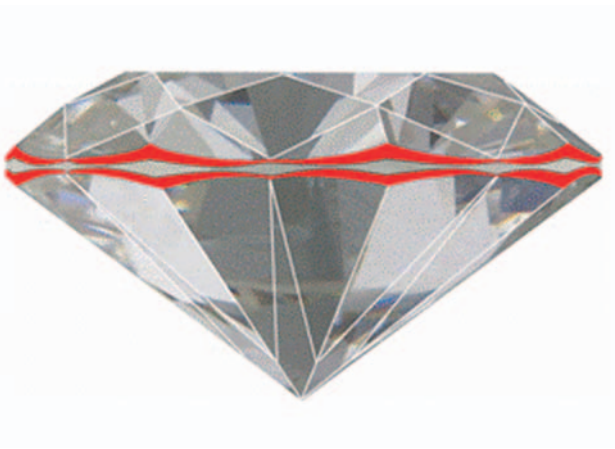
this shift is three-dimensional and also changes the half-facet angles. It allows the halves to be polished down only very lightly, which cutters refer to as "just painting or pasting the facets on" (see figure 1, middle). In a diamond painted on both the crown and pavilion (see figure 3), the average thickness of the girdle at the upper-lower half junctions is always greater than its average thickness at the bezel-main junctions (i.e., distance B is g*reater than* distance A).

In contrast, when the halves are strongly tilted away from the bezel or pavilion mains (that is, there is a sharp edge between the facets), the practice is called digging out, a term that originated from the "digging out" or "picking up" of facets to remove naturals near the girdle (see figure 1, bottom).

A diamond that is "dug out" on both crown and pavilion (see figure 4) always has thinner girdles on average at the upper-lower half junctions than at the bezel-main junctions (i.e., distance B is *less than* distance A).

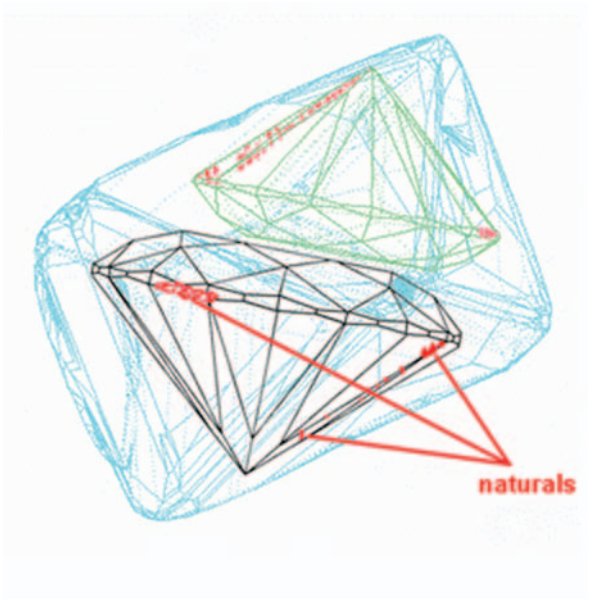
REASONS FOR PAINTING AND DIGGING OUT

Although most in the trade regard painted and dug-out diamonds (beyond a minimal amount) as improperly fashioned, there are numerous reasons why a cutter might choose to pursue these options. In particular, when a diamond is close to an important weight threshold, such as 0.50 carats, 1 carat, 2 carats etc., painting and digging out offer cutters more flexibility to maximize weight yield from the rough. As an example, figure 5 (red area) shows additional volume retained by painting, which



The area in red represents the additional volume gained by a diamond that is severely painted relative to a "standard" brillianteered diamond. The corresponding weight difference associated with the red area shown is approximately 1.5 percent.

Figure 5

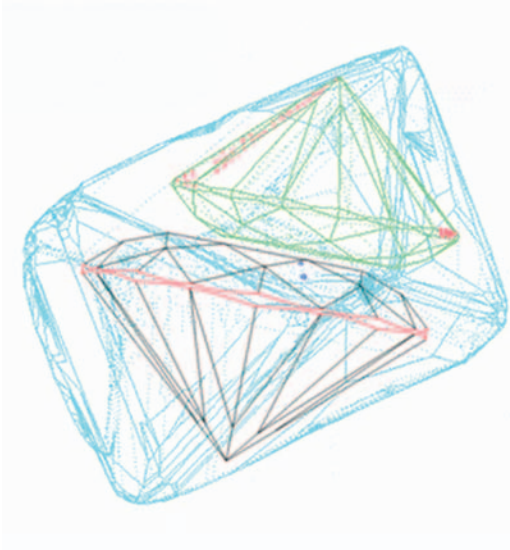


Planned diamonds in a rough crystal show potential naturals (in red) on the larger, "standard" brillianteered diamond, where the round brilliant intersects the surface of the rough. Image by DIAMSCAN NV Belgium; modified by GIA.

Figure 6

may add up to 3 percent to 4 percent more weight for the same proportions. (In this example, roughly 1.5 percent more weight is saved.)

Such a technique can be used to yield a larger finished diamond by allowing the cutter to remove naturals from the increased surface area that would intersect the rough. Figures 6 and 7 show where the planned larger diamond intersects the surface of a rough crystal. If a stone with these proportions is cut with a "standard" girdle, the diamond will probably have large or indented naturals. Painting, as shown in figure 7, allows the maximum weight to be gained from the rough by avoiding indented naturals that would impact the clarity grade. Because the intersection of the rough may occur in only a few locations, painting or digging out may not be done uniformly.



Painting the girdle of the planned larger diamond (black and red outlines) removes potential naturals and saves weight. Image by DIAMSCAN NV Belgium; modified by GIA.

Figure 7

In a recent trend, painting has been used to obtain specific optical effects such as greater contrast. In addition, painting or digging out may be used to avoid a negative appearance aspect for some proportions, such as a borderline fish-eye, or to modify the overall girdle profile to improve the verbal description of girdle thickness.

IMPACT IN THE GIA CUT GRADING SYSTEM

The visual impact of painting and digging out varies with the combination of diamond proportions in a complex way, and the visual impact on diamonds with unusual proportions is still poorly understood. Among diamonds of typical proportions, the Gemological Institute of America (GIA) has found that most people prefer diamonds that are neither painted

nor dug out beyond minimal thresholds. The charts show the face-up appearance of diamonds with typical proportions that have been painted and/or dug out severely as described below and on the following page (see figures 8a, 9a, 10a, 11a, 12a and 13a). Profile views for each category show both severe cases that would receive lower grades in the GIA's cut system (see figures 8b, 9b, 10b, 11b, 12b and 13b), as well as more moderate examples that may also receive lower grades (see figures 8c, 9c, 10c, 11c, 12c and 13c). In the examples shown

Painting the Crown Only

Most of the observers in the GIA's cut study found that the patterns seen in diamonds with significant painting on the crown were similar to those seen in diamonds without painting, but some dark areas were much darker, giving an overall impression that the diamond was not as bright. For example, the pattern radiating from the center is darker and extends further into the crown area for diamonds severely painted on the crown (figure 8a) than for those diamonds with the same proportions that are not painted. This makes the fire (which does not change significantly) stand out more strongly against the dark background, while it diminishes the brightness of the diamond.

Figure 8a

Figure 8b: *Severe painting on the crown only.*

Figure 8c: *Moderate painting on the crown only.*

Digging Out the Crown Only

Severe digging out can lead to a darkening of the upper-half facets of a diamond, as the junctions between the dug-out facets become less discernible; the result is that adjacent facets (the two upper halves) begin to look like a single large facet. This can alter scintillation or contrast patterns (the patterns of flashing light and dark areas seen when the diamond is rocked, tilted or rotated) by causing larger regions of the diamond to flash at the same time, thereby changing the balance of "sparkliness" and altering the pattern.

Figure 9a

Figure 9b: *Severe digging on the crown only.*

Figure 9c: *Moderate digging on the crown only.*

Painting the Pavilion Only

While painting on the pavilion can save more weight than the equivalent painting on the crown, the visual impact is stronger as the pattern tends to have broad areas of dark and light radiating from the center. This stronger visual impact is consistent with the greater influence of small differences in pavilion angle on appearance in general.

Figure 10a

Figure 10b: *Severe painting on the pavilion only.*

Figure 10c: *Moderate painting on the pavilion only.*

in figure 14, painting and digging out have much less of an effect on appearance — and are considered negligible by many manufacturers; these diamonds would not receive a lower grade in the upcoming GIA system because of painting or digging out.

PAINTING THE CROWN ONLY

A common variation on brillianteering is painting on the crown only as shown in figure 8. Painting on the crown may be employed to alter the contrast

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Digging Out the Pavilion Only

While digging out on the pavilion can save more weight than the equivalent digging out on the crown, the visual impact is stronger (similar to painting on the pavilion), causing diamonds to have an interrupted pattern that results in an overall gray appearance lacking in contrast.

Figure 11a

Figure 11b: *Severe digging out on the pavilion only.*

Figure 11c: *Moderate digging out on the pavilion only.*

Painting the Crown and Pavilion

The additive effect of painting on both crown and pavilion causes more extremes in appearance. While figure 10a shows how a pattern caused by painting tends to have broad areas of dark and light radiating from the center, the effect of painting both the crown and pavilion is stronger, causing the broader and darker bands shown here.

Figure 12a

Figure 12b: *Severe painting on the crown and pavilion.*

Figure 12c: *Moderate painting on the crown and pavilion.*

Digging Out the Crown and Pavilion

The additive effect of digging out on both crown and pavilion also causes more extremes in appearance. Note here how the center has become darker, with a bright band at the top of the crown (seen as a ring-like band under the star facets), blending to a dark band around the outside of the crown.

Figure 13a

Figure 13b: *Severe digging out on the crown and pavilion.*

Figure 13c: *Moderate digging out on the crown and pavilion.*

Painting and Digging Out

(Continued from page 243)

pattern or to save weight. GIA observers found that typically proportioned diamonds with significant painting had dark areas that were darker than in diamonds with similar proportions and standard brilliantteering. Figure 8a shows an example of severe crown painting, which causes the radiating pattern in the table to darken and extend into the crown area. The result is a diamond that appears less bright overall, according to most observers.

DIGGING OUT THE CROWN ONLY

Digging out of the crown is often done to remove clarity characteristics or naturals. A common result is that the upper halves look dark (see figure 9a). This pattern makes the diamond appear smaller since the bright area of the diamond does not extend to the girdle edge. Also, the facet junctions between the adjacent dug out upper-half facets become less discernible, so that each pair looks like a single large facet, significantly altering scintillation and contrast patterns.

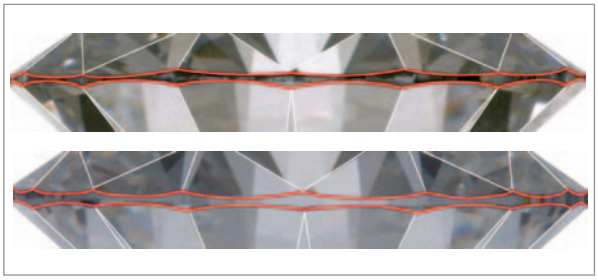

Figure 14

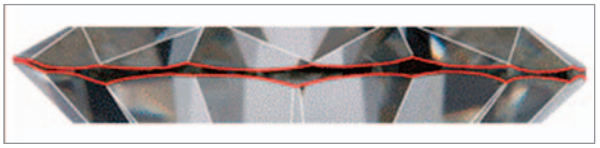

Figure 15

PAINTING THE PAVILION ONLY

Painting on the pavilion can save more weight than equivalent painting on the crown because the lower halves are larger, but the visual impact is also more negative, causing diamonds to have broad dark and light areas that radiate from the center to the girdle edge (see figure 10a).

DIGGING OUT THE PAVILION ONLY

As with the crown, digging out of the pavilion is often not uniform on all the pavilion lower halves. This causes an uneven girdle thickness, which may lower the symmetry grade. Figure 11a shows a severe example of (mostly uniform) digging out of the pavilion lower halves, which causes an interrupted pattern that results in an overall gray appearance lacking in contrast.

Figure 14: *These examples of weak painting on the crown (top) and weak digging out on the crown (bottom) have negligible effect on a diamond's face-up appearance and would therefore not receive a lower grade in the GIA cut system.* ***Figure 15:*** *Painting on the crown and digging out on the pavilion results in a wavy girdle for this diamond. Not only might there be a painting/digging out deduction, but a wavy girdle is also considered in the symmetry grade.*

PAINTING OR DIGGING OUT BOTH CROWN AND PAVILION SIDES

This kind of brilliantteering has the greatest visual impact because the negative aspects of crown and pavilion are combined (see figures 3 and 4). Diamonds that are severely painted on both sides typically show radiating dark and light areas (see figure 12a), whereas digging out on both sides often produces a ring-like pattern (see figure 13a).

PAINTING AND DIGGING OUT OPPOSING SIDES

This combination has somewhat less visual impact because the painting on the crown, for example, is somewhat compensated for by the digging out of the pavilion. However, this type of brilliantteering produces a wavy girdle profile (see figure 15), which is often considered in the diamond's symmetry grade.

CONCLUSION

Painting and digging out are variations of brilliantteering that are used in the final stage of the cutting process; either can be applied to the crown alone, to the pavilion alone or to both the crown and the pavilion with various combinations and levels of severity. For typical proportion combinations, in all cases of painting and digging out beyond a certain degree, the observation testing (including trade observations) that the GIA conducted as part of the development of the upcoming GIA cut grading system confirmed that the appearance of the diamond was less preferred than a diamond of similar proportions with standard brilliantteering. Painting or digging out on both crown and pavilion has a more negative impact on the appearance of the diamond than if the painting or digging out occurs only on one side. In agreement with these observations, the GIA cut grading system will take into account various extents and combinations of painting or digging out. ✦

For further information on the GIA diamond cut grading system, see Moses et al., A foundation for grading the overall cut quality of round brilliant cut diamonds. *Gems & Gemology,* 2004:40(3); pp. 202–228.

Note: Because of the difficulties inherent in photographing fine distinctions in appearance aspects, the images shown in figures 8a through 13a may not perfectly match what is seen when the actual diamonds are viewed face up. Photos in figures 2 through 5 and 8 through 13 © 2005 GIA. Profile photographs by Don Mengason. Face-up photographs by Al Gilbertson.